

### SUPPORT FOR THE AMENDMENTS

Applicants have rewritten Claims 1 and 8 as new Claims 24 and 25, respectively. Accordingly, support for new Claims 24 and 25 can be found in Claims 1 and 8, as originally filed. Claims 11, 12, 15, 16, and 19-23 have been amended to correct their dependencies. Support for amended Claims 11, 12, 15, 16, and 19-23 can be found in the same claims, as originally filed. Applicants have also added new Claims 26-28. Support for new Claims 26-28 can be found in Scheme 3 on page 16, of the specification.

No new matter has been added. Claims 2-7 and 9-28 are active in this application.

### REMARKS/ARGUMENTS

At the outset, Applicants' representative wishes to thank Examiner Chandrakumar and Supervisory Patent Examiner Seaman for the helpful and courteous discussion held on June 26, 2008, during which the prosecution of the above-identified application was materially advanced. The following remarks will expand and summarize the issues discussed.

The rejection of Claim 1 under 35 U.S.C. § 102(b) in view of Tsunoi et al. and the rejection of Claim 1 under 35 U.S.C. § 102(b) in view of Ihara et al. have been obviated by amendment. As the Examiner will note, Claim 1 has been rewritten as new Claim 24, which excludes the compounds which correspond to compound 2d of Tsunoi et al. and compounds 51 and 52 of Ihara et al. Accordingly, new Claim 24 is clearly not anticipated by either Tsunoi et al. or Ihara et al.

In addition, these references do not raise a question of obviousness for any of the other compounds recited in Claim 24. In this regard, both Tsunoi et al. and Ihara et al. are directed toward synthetic methods and do not appear to disclose any utility for any of the synthesized compounds other than as synthetic intermediates. Thus, neither of these

references provide any motivation to modify the structure of any of the disclosed compounds. Accordingly, these references cannot make any of the other claimed compounds obvious. *See, In re Lalu and Foulletier*, 223 USPQ 1257, 747 F2d 703 (Fed. Cir. 1984) (copy attached).

For all of these reasons, the rejection should be withdrawn.

The rejection of Claims 8-18 under 35 U.S.C. § 103(a) in view of Rebrovic et al. in view of Bourdineaud et al. and Kaiser is respectfully traversed. Although this rejection as set out in the Office Action did not include Claim 2, based on the discussion with Examiner Chandrakumar, the patentability of Claim 2 over these references will be addressed herein.

In this regard, Claim 2 requires a very specific pattern of substitution with *four* substituents in the  *$\alpha$ -,  $\beta$ -, and  $\gamma$ -positions*.

In contrast, Kaiser appears to disclose only compounds which are *mono-substituted in the  $\gamma$ - and  $\delta$ -positions*. Moreover, it appears that the *lone  $\gamma$ -substituent must be a methyl group*, while in Claim 2, the  $\gamma$ -position is substituted with both methyl and propenyl groups. The situation is much the same for Bourdineaud et al. which also appears to only disclose compounds which are *only substituted in the  $\omega$ -position ( $\gamma$ -position when  $n = 0$ ,  $\delta$ -position, when  $n = 1$ )*.

Rebrovic et al. discloses certain  $\alpha$ -alkyl- $\delta$ -valerolactones (*see, e.g.*, col. 7, line 56, to col. 8, line 30). However, this reference is also completely silent in regard to any compound which has the substitution pattern required by Claim 2. In fact, this reference also discloses:

Preferred substituents for the above reaction are wherein  $R^*$  is C1-4 alkyl,  $R_1$  is a C<sub>1-8</sub> alkyl,  $R_3$ ,  $R_4$ ,  $R_5$ , and  $R_6$  are hydrogen or C<sub>1-8</sub> alkyl and  $R'$  is hydrogen C<sub>1-8</sub> alkyl or alkenyl, C<sub>3-8</sub> cycloalkyl or cycloalkenyl, phenyl or substituted phenyl, or benzyl or substituted benzyl.

It is particularly preferred where  $R_3$ ,  $R_4$ ,  $R_5$  and  $R_6$  are all hydrogen.

*See*, col. 8, lines 23-30.

Thus, Rebrovic et al. discloses that it is preferred to have substituents *only* in the  $\alpha$ - and  $\delta$ -positions and teaches away from the compound of Claim 2 which is substituted in the  $\alpha$ -,  $\beta$ -, and  $\gamma$ -positions.

For all of these reasons, these references, even in combination, cannot create a *prima facie* case of obviousness against Claim 2 or the claims dependent thereon.

The arguments in support of the patentability of Claims 8-18 (now Claims 9-18 and 25) over these references are essentially the same as those noted above in support of Claim 2. None of the cited references disclose or suggest any compounds which have the substitution pattern required by the present claims.

Specifically, Claim 9 recites the same compound as Claim 2 and is patentable over the cited references for the same reasons as Claim 2. Claim 13 depends from Claim 9 and is patentable over the cited references for the same reasons Claims 2 and 9 are. Claim 10 depends indirectly from Claim 2 and is patentable over the cited references for the same reasons Claim 2 is.

Claims 11, 12, and 15-18 depend from Claims 9 or 25. To the extent these claims depend from Claim 9, they are patentable over the cited references for the same reasons as Claims 2 and 9. To the extent these claims depend from Claim 25, they and Claim 25 are patentable over the cited references, because these reference, even in combination, fail to suggest compounds with the specific degree and pattern of substitution recited in Claim 25.

Likewise, Claim 14 recites a composition comprising "two or more" compounds with a degree and pattern of substitution which are not suggest by the cited references even when taken in combination.

For all of these reasons, the rejection should be withdrawn.

The rejection of Claim 1 under 35 U.S.C. § 112, second paragraph, has been obviated by amendment. Applicants have rewritten Claim 1 as suggested on page 2 of the Office Action. Accordingly, the rejection is no longer tenable and should be withdrawn.

The rejections of Claims 3-5 and 6-7 under 35 U.S.C. § 112, second paragraph, are respectfully traversed. In the Office Action it is asserted that the claims are indefinite because they do not include enough particulars of the process, *i.e.*, for omitting critical steps. It is further asserted that these reactions would not proceed without the use of certain enzymes or organometallic reagents. However, as shown in Scheme 3, on page 16, and in Examples 4 and 5, on pages 34-36, of the specification this assertion is incorrect.

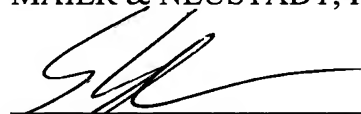
During the above-noted discussion, the question of the how the carboxyl group in the compound of formula (L) came to be without the use of an oxidizing agent in the step going from the compound of formula (K) to the compound of formula (L) arose. However, it was noted that in the compound of formula (K) there are two carbonyl groups, while in the compound of formula (L) there is one carboxyl group and one hydroxyl group. Thus, the net oxidation state of the compounds of formulae (K) and (L) are the same, and no oxidizing agent is required.

For all of these reasons, the rejection is improper and should be withdrawn.

Applicants submit that the present application is now in condition for allowance, and early notification of such action is earnestly solicited.

Respectfully submitted,

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**223 USPQ 1257**  
**In re Lalu and Foulletier**  
**U.S. Court of Appeals Federal Circuit**

No. 83-1358

Decided November 2, 1984

747 F2d 703

## Headnotes

### PATENTS

[1] **Patentability - Invention - Specific cases - Chemical** ([► 51.5093](#))

Mere fact that reference cites compounds, structurally similar to applicants' claimed compounds, that can be used as intermediates in production of reference's claimed compounds does not provide adequate motivation for one of ordinary skill in art to stop reference's synthesis and investigate intermediate compounds with expectation of arriving at applicants' claimed compounds that have different uses, rendering structural obviousness rejection unsupported.

### Particular Patents

#### Particular patents - Sulfonic Acids

Lalu and Foulletier, New Polyfluorinated Sulfonic Acids and their Derivatives, rejection of claims 13-22 *reversed*.

### Case History and Disposition

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Appeal from Patent and Trademark Office Board of Appeals.

Application for patent of Jean Pierre Lalu, and Louis Foulletier, Serial No. 966,508, filed Dec. 4, 1978. From decision rejecting claims 13-22, applicants appeal. Reversed.

### Attorneys

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Joseph F. Nakamura, Solicitor, Jere W. Sears, Deputy Solicitor, and Henry W. Tarring, II, Associate Solicitor, for Patent and Trademark Office.

### Judge

Before Baldwin and Kashiwa, Circuit Judges, and Cowen, Senior Circuit Judge.

## Opinion Text

### Opinion By:

Baldwin, Circuit Judge.

This appeal is from a decision of the United States Patent and Trademark Office Board of Appeals (board) affirming the rejection under 35 U.S.C. §103 of claims 13-22, all of the claims of appellants' application Serial No. 966,508, filed December 4, 1978, for "New Polyfluorinated Sulphonic Acids and Their Derivatives." We reverse.

### The Invention

The invention relates to perfluoroalkyl sulfonyl chlorides and bromides having the formula:

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wherein the perfluoroalkyl group

*Graphic material consisting of a chemical formula or diagram set at this point is not available. See text in hard copy or call BNA at 1-800-372-1033.*

is defined by n being a number between 1 and 20, Z is a chlorine or bromine atom, and the bridging group (CH<sub>2</sub>)<sub>b</sub> is defined by b being a number between 2 and 20.

The claimed compounds are useful in the textile, leather, and paper industries. The compounds have utility as corrosion inhibiting agents, surface active agents, and leveling agents, and therefore can be incorporated into waxes, greases, varnishes, and paints to improve the spreading out and leveling of such viscous products.

Claim 13, the only independent claim on appeal, is illustrative:

13. A product having the formula

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wherein

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represents a straight or branched perfluorinated hydrocarbon chain, n is a number between 1 and 20, b is a number between 2 and 20 and Z is a chlorine or bromine atom.

Claims 14-22 depend from claim 13 and further limit the parameters n, b, and Z which define the length of the perfluoroalkyl group, the length of the bridging group, and the nature of the Z halide group, i.e., a chlorine or bromine atom.

### **The Prior Art**

The sole reference relied upon by the board is United States Patent No. 3,130,221 issued April 21, 1964 to Oesterling. Oesterling discloses 1,1-dihydroperfluoroalkyl sulfonic acids having the formula:

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wherein

*Graphic material consisting of a chemical formula or diagram set at this point is not available. See text in hard copy or call BNA at 1-800-372-1033.*

is a lower perfluoroalkyl group and the bridging group is a methylene (CH<sub>2</sub>) group. According to Oesterling, "The compounds of this invention include the 1,1-dihydroperfluoroalkyl acids containing from two to five carbon atoms; i.e., from one to four carbon atoms in the \* \* \* [perfluoroalkyl] portion of the molecule." These compounds are strong acids and are used in reactions such as base neutralization, alkylation catalysis, and metal cleaning. Additionally, the compounds are useful as high energy fuels such as liquid rocket propellants because of their relatively high thermal stability. Of the group of acids disclosed by Oesterling, "the preferred compound for use as a high energy fuel is 1,1-dihydroperfluoroethylsulfonic acid [CF<sub>3</sub>CH<sub>2</sub>SO<sub>3</sub>H]. As the number of carbon

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atoms in the molecule increases, the thermal stability decreases and compounds containing above five carbon atoms are of little value as a fuel."

The claimed sulfonic acids are prepared in the reference by chlorination of the corresponding bis (1,1-dihydroperfluoroalkyl) disulfides to form the corresponding 1,1-dihydroperfluoroalkyl sulfonyl chlorides, which are then hydrolyzed to produce the product 1,1-dihydroperfluoroalkyl sulfonic acids. The intermediate sulfonyl chlorides which are used to prepare the final product acids have the formula:

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wherein

*Graphic material consisting of a chemical formula or diagram set at this point is not available. See text in hard copy or call BNA at 1-800-372-1033.*

is also a lower perfluoroalkyl group and the bridging group is a methylene (CH<sub>2</sub>) group. Oesterling teaches that the hydrolysis may be carried out without isolation of the intermediate sulfonyl chloride, but it is preferable to hydrolyze isolated sulfonyl chloride in order to obtain a purer sulfonic acid product.

### The Rejection

The examiner rejected the claims based on structural obviousness because Oesterling teaches homologous compounds. The examiner said, "Oesterling discloses only one method of preparing the sulfonic acids which *requires* the use of the halide intermediate. One motivated to prepare the homologous acids would similarly be motivated to prepare the homologous acids halides." (emphasis in original).

The board, in affirming the examiner's rejection, said the close structural similarity between the reference sulfonyl chloride compounds and the claimed compounds was sufficient to raise the presumption of obviousness. The board said further:

The fact that the reference teaches that the sulfonyl chloride compounds are useful as an intermediate or a starting compound for the production of a corresponding sulfonic acid as opposed to the appellants' disclosure that the claimed compounds have other utilities does not by itself rebut the prima facie case of obviousness made out by the Examiner. \*

\* \*

The case of *In re Stemniski*, 58 CCPA 1410, 444 F.2d 581, 170 USPQ 343 (1971), is distinguishable since here Oesterling discloses a utility (a starting material for making an acid) for the pertinent sulfonyl chlorides, whereas in *Stemniski* the reference disclosed no utility for the relevant compound. In view of the unequivocal identification and isolation of the sulfonyl chloride by Oesterling and the specific utility taught for the compound, a starting material for the preparation of a useful acid, the portions of the court's decision in *In re Gyurik*, 596 F.2d 1012, 201 USPQ 552 (CCPA 1979), relied upon by the appellants are not considered to dictate reversal of the Examiner's holding.

### Opinion

Appellants argue that the acid taught by Oesterling is limited to a maximum of five carbon atoms and, therefore, there would be no motivation for one of ordinary skill to prepare an acid, or its predecessor sulfonyl chloride containing more than five carbon atoms. Accordingly, appellants contend that since their compounds may contain up to forty carbon atoms, they are not structurally similar to the Oesterling intermediate sulfonyl chlorides. We disagree with appellants' contentions because the Oesterling teachings regarding the five carbon atom limitation are related only to the use of the product acid as a high energy fuel. Oesterling discloses other uses for the disclosed sulfonic acids, such as in base neutralization, alkylation catalysis, and metal cleaning, to which the teachings of a five carbon atom limitation do not necessarily apply. Moreover, even if the compounds disclosed by Oesterling are limited to compounds containing two to five carbon atoms, the appellants' compounds contain as few as three carbon atoms.

We are, however, persuaded that the board erred in its conclusion of prima facie obviousness.

In determining whether a case of prima facie obviousness exists, it is necessary to ascertain whether the prior art teachings would appear to be sufficient to one of ordinary skill in the art to suggest making the claimed substitution or other modification. In *re Taborsky*, 502 F.2d 775, 780, 183 USPQ 50, 55 (CCPA 1974). The prior art must provide one of ordinary skill in the art the motivation to make the proposed molecular modifications needed to arrive at the claimed compound. In *re Stemniski*, 444 F.2d 581, 586, 170 USPQ 343, 347 (CCPA 1971), *Taborsky*, 502 F.2d at 781, 183 USPQ at 55, In *re Murch*, 464 F.2d 1051, 175 USPQ 89 (CCPA 1972), In *re Fay*, 347 F.2d 597, 146 USPQ 47 (CCPA 1965).

In *Stemniski*, the claimed compounds were rejected over structurally closely related compounds disclosed in prior art references. The references did not disclose or suggest any usefulness or significant properties, whereas the applicant disclosed a use for the claimed compounds in his application.

In such a case the court reasoned that the requisite motivation to make the claimed

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compounds would not be present. The court doubted whether a prima facie case of obviousness existed:

How can there be obviousness of structure, or particularly of the subject matter as a whole, when no apparent purpose or result is to be achieved, no reason or motivation to be satisfied, upon *modifying* the reference compounds structure? Where the prior art

reference neither discloses nor suggests a utility for certain described compounds, why should it be said that a reference makes obvious to one of ordinary skill in the art an isomer, homolog or analog of related structure, when that mythical, but intensely practical, person knows of no "practical" reason to make the reference compounds, much less any structurally related compounds?

444 F.2d at 586, 170 USPQ at 347.

Appellants argue that since several utilities were disclosed for the compounds claimed, and Oesterling teaches no significant properties or utility for the disclosed sulfonyl chlorides except as intermediates in the formation of the product sulfonic acids, the rejection of the instant claims is not proper in view of *Stemniski*. The Patent and Trademark Office (PTO) contends that *Stemniski* is satisfied and the rejection is proper because Oesterling discloses that the sulfonyl chlorides are used as intermediates or starting materials for producing useful acids.

The PTO further argues that the disclosed utility for the Oesterling sulfonyl chlorides as an intermediate for producing useful acids is a usefulness conforming with statutory guidelines, but cites cases for support which are actually inapposite: *Reiners v. Mehlretter*, 236 F.2d 418, 421-22, 111 USPQ 97, 100 (CCPA 1956), an interference in which structural obviousness was not an issue, and *In re Kirk*, 376 F.2d 936, 943-44, 153 USPQ 48, 54 (CCPA 1967), a case dealing with appellant's disclosure of "how to use" the claimed compounds under 35 U.S.C. §112.

Other cases involving obviousness have dealt with the role of intermediates. In *In re Gyurik*, 596 F.2d 1012, 201 USPQ 552 (CCPA 1979), the claimed thio compounds were rejected as *prima facie* obvious over a reference which generally disclosed such thio compounds as intermediates in the preparation of the corresponding sulfonyl compounds having the same general properties as those of the claimed compounds. The issue framed by the court was based solely upon the status of the claimed compounds as intermediates in the production of end products specifically named in the prior art.

In reversing the obviousness rejection the court said:

An element in determining obviousness of a new chemical compound is the motivation of one having ordinary skill in the art to make it. That motivation is not abstract, but practical, and is always related to the properties or uses one skilled in the art would expect the compound to have, if made. In *re Stemniski* \* \* \* \* The present obviousness rejection cannot stand without some basis in the expected properties of the claimed compounds.

In obviousness rejections based on close similarity in chemical structure, the necessary motivation to make a claimed compound, and thus the *prima facie* case of obviousness, rises from the expectation that compounds similar in structure will have similar properties. \* \* \* No common-properties presumption rises from the mere occurrence of a claimed compound at an intermediate point in a conventional reaction yielding a specifically named prior art compound. That an intermediate/end-product relationship exists between a claimed compound and a prior art compound does not *alone* create a common-properties presumption. Absent that presumption or other evidence of motivation, it cannot be said that it would have been obvious to stop the process for synthesizing the disclosed end product and isolate the claimed intermediate.<sup>1</sup> [Citations omitted.]

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<sup>1</sup> The mere ability of a compound to act as an intermediate toward the production of other compounds does not alone constitute the sort of "property" that the cases on obviousness of chemical compounds contemplated.

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*Id.* at 1018, 201 USPQ at 557-8.

The court explained footnote 14 of *Gyurik* in *In re Magerlein*, 602 F.2d 366, 373 n.15, 202 USPQ 473, 479 n.15 (CCPA 1979):

Our recent statement \* \* \* should not be read out of context as suggesting that the capacity to react to produce another compound is not, *ipso facto*, a property. The statement is merely a recognition that *there is no common-properties presumption or evidence of motivation to make the intermediate from the mere fact that an intermediate is in the chain of production of another compound.* [Emphasis added.]

Although *Gyurik* was not a case of obviousness based on structural similarity, and the facts of both *Gyurik* and *Magerlein* are different from those here, the dicta in those cases is helpful as a guide.

The PTO places great emphasis on the label "useful," contending that because the Oesterling final product is "useful," the intermediate sulfonyl chlorides are also "useful."



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That there is no common-properties presumption accorded to an intermediate and the end product of the reaction involving that intermediate necessarily means that there is no presumption that an intermediate's utility would be the same as that of the end product. Even if an unspecified "usefulness" or utility were all Sterniski requires, such utility could not be imputed from the fact that the Oesterling final product is "useful." The use of such labels, however, is meaningless because we always look to "the subject matter as a whole" in determining whether the subject matter "would have been obvious at the time the invention was made." Further, a relevant property of a compound cannot be ignored in the determination of non-obviousness. In re *Papesch*, 315 F.2d 381, 391, 137 USPQ 43, 51 (CCPA 1963).

Ultimately our analysis of the obviousness or nonobviousness of appellants' claimed compounds requires inquiry as to whether there is anything in the Oesterling reference which would suggest the expected properties of the claimed compounds or whether Oesterling discloses any utility for the intermediate sulfonyl chlorides which would support an expectation that the claimed compounds would have similar properties.

[ 1 ] There is no disclosure that the Oesterling compounds would have any properties in common with those of appellants' compounds, as those properties of the former relate to the use of the compounds for base neutralization, catalysis, metal cleaning, and fuel. The mere fact that Oesterling's sulfonyl chlorides can be used as intermediates in the production of the corresponding sulfonic acids does not provide adequate motivation for one of ordinary skill in the art to stop the Oesterling synthesis and investigate the intermediate sulfonyl chlorides with an expectation of arriving at appellants' claimed sulfonyl halides for use as corrosion inhibiting agents, surface active agents, or leveling agents.

Oesterling does not teach the isolation and investigation of the intermediate sulfonyl chlorides, but rather discloses, as an optional step, the isolation and purification of the intermediate to obtain a purer sulfonic acid end product. The isolation and subsequent use of the intermediate sulfonyl chlorides in the production of the corresponding useful sulfonic acids is not motivation sufficient to support the structural obviousness rejection. The board has therefore failed to properly establish that the claimed compounds would have been prima facie obvious in view of Oesterling.

The decision of the board affirming the rejection of claims 13-22 is reversed.

- End of Case -

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